

Five New Fish Species of the Genus *Alabes* (Gobiesocidae: Cheilobranchinae)

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ABSTRACT. Five new species of shore-eels in the genus *Alabes* are described from southern Australia: *A. elongata* (Western Australia); *A. gibbosa* (Western Australia); *A. occidentalis* (Western Australia); *A. obtusirostris* (Victoria and Western Australia); and *A. scotti* (New South Wales and Tasmania). The first three species inhabit shallow nearshore reef and/or weed areas, whereas the last two have been found only on soft bottoms in deeper coastal waters (24–65 m). This brings the total number of described species to nine (previously known species are *A. dorsalis* [Richardson], *A. parvula* [McCulloch], *A. brevis* Springer & Fraser, and *A. hoesei* Springer & Fraser). Two of the new species, *A. elongata* and *A. occidentalis*, appear to be western sister species of southeastern Australian forms (*A. dorsalis* and *A. parvula*, respectively), whereas one new Western Australian species, *A. gibbosa*, is similar to another western form, *A. brevis*. The apparent relationships of the remaining two new species, *A. obtusirostris* and *A. scotti*, are obscure. The former is similar to *A. dorsalis* but lacks a rudimentary pelvic fin, whereas the latter shows some similarities to *A. parvula* but possesses a more pointed head and a unique coloration. A key to *Alabes* species is provided.

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Members of the Australian endemic gobiesocid subfamily Cheilobranchinae—commonly referred to as shore-eels—are small, elongate fishes belonging to a single genus *Alabes* (Cloquet, 1816). They inhabit temperate waters, forming a unique assemblage of what was first thought to represent a variety of synbranchid eel. Springer & Fraser (1976) showed, however, that these eel-like fishes should be included with the Gobiesocidae. Their review recognized four species: *Alabes dorsalis* (Richardson, 1845), *A. parvula* (McCulloch, 1909), *A. brevis* and *A. hoesei*, the last two described as new. Springer & Fraser (1976) suggested that a single specimen of *Alabes* from Norfolk Island off eastern Australia might also represent a new species but were

unwilling to describe it based on a single specimen. All members of the genus possess a small ventral slit-like gill opening, have no pectoral fins, either have small, rudimentary pelvic fins or lack them entirely, and their dorsal and anal fins are represented by fin folds that lack fin-rays and are continuous with a small caudal fin that does have fin-rays. Unlike clingfishes, they do not possess the characteristic ventral sucking disc, although one species, *Alabes dorsalis*, was shown by Springer & Fraser (1976: fig. 11d) to have what appears to be a rudimentary disc. Nevertheless, one unique osteological character is shared between clingfishes and shore-eels: the supracleithrum bears a concave process at its outer end that articulates with a

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Table 1. Distinguishing characters of the species of *Alabes* (see methods for abbreviations).

character	<i>dorsalis</i>	<i>elongata</i> n.sp.	<i>brevis</i>	<i>gibbosa</i> n.sp.	<i>hoeisei</i>	<i>parvula</i>	Norfolk I species	<i>occidentalis</i> n.sp.	<i>scotti</i> n.sp.	<i>obtusirostris</i> n.sp.
pelvic fins	present	present	rudiment	rudiment	absent	absent	absent	absent	absent	absent
gill slit	large	large	medium	medium	small	small	small	small	small	large
POP	1	1	2 (wide)	2 (wide)	2 (close)	1	1	1	1	0
ANP	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
PNP	no	no	no	yes	yes	no	no	no	no	no
LP	yes	no	yes	yes	yes	yes	no	no	no	no
vertebrae (total)	66–78	74–78	60–61	68–69	63–71	63–74	71	65–69	68	70
vertebrae (precaud)	22	22	22	18	16	17–19	?	16–17	22	23
last epipleural	21–27	28	21–22	20	14–16	16–20	20	15–17	26	40
caudal rays	7–9	6–9	9–12	9–11	7–8	4–6	0?	4–6	4–5	8
body transparent	no	no	no	no	yes	yes	?	yes	no	?
gut extension	—	—	—	—	long	short	?	short	—	—
tail length	short	long	short	long	long	long	short	long	long	long
dorsal origin	over anus	post. anus	post. anus	over anus	over anus	over anus	post. anus	over anus	ant. anus	post. anus
longest specimen	120 mm	92 mm	36 mm	92 mm	44 mm	47 mm	32 mm	40 mm	46 mm	46 mm
distribution	NSW-SA	WA	WA	WA	NSW-WA	Qld.,NSW,Tas	Norfolk I	WA	NSW-Tas	Vic, WA
habitat	reef & weed	reef & weed	reef & weed	seagrass	reef & weed	reef & weed	reef & weed?	seagrass	deep water	deep water

convex condyle on the anterior surface of the cleithrum. Interestingly, all species of *Alabes* and most clingfishes apparently turn reddish when placed in formalin, although this is not unique to these two groups. On the basis of Springer & Fraser's work, *Alabes* remains in the Gobiesocidae (Eschmeyer, 1990).

The current study commenced in the late 1970's after the senior author collected several apparently new species of *Alabes* from southern Western Australia. While reviewing the literature, it was noted that *A. dorsalis*, a species that is common in the temperate nearshore reefs of southeastern Australia, has a type locality of tropical northwestern Australia. No other evidence could be found to suggest that members of the genus have ever inhabited tropical waters, throwing into doubt the accuracy of the type locality. If, on the other hand, the type specimens had been collected from southwestern Australia and labelled incorrectly, then one of the supposed new species might in fact be the true *A. dorsalis*, and thus the southeastern form would require renaming. Furthermore, the type locality for *Cheilobranchus aptenodytum* Richardson (= *A. dorsalis* [after Springer & Fraser, 1976]) was given as Penguin Island, latitude 72°S, which also appeared to represent an error as no additional specimens of the genus have since been discovered so far to the south. It seemed appropriate, therefore, to again review the genus to sort out these problems.

Like other clingfishes, members of *Alabes* lose their colour patterns quickly after preservation. As coloration in the family is often sexually dimorphic and geographically variable, it was necessary to obtain fresh material to discover colour variations of the various forms. Collections were made across all southern Australian States, and much of the available material housed in Australian and European Museums was examined. We found, firstly, that Australian waters are inhabited by at least nine species of *Alabes*, five of which were undescribed, secondly, that the types of *A. dorsalis* were more likely collected in Tasmania or Victoria than Western Australia, and thirdly, that the type of *Cheilobranchus aptenodytum* is in such a poor state that it is unidentifiable. In addition, we concur with Springer & Fraser (1976) that the single specimen of *Alabes* from Norfolk Island may also be undescribed, but the lack of additional material still precludes a firm decision on this. Thus descriptions of the five new species of *Alabes* are presented here as a contribution to the volume on new Australian fishes. Despite the inclusion of a table of diagnostic characters for the genus (see below), a complete review of *Alabes* is still progressing and will be published later.

Materials and methods

Methods of counting and measuring follow those of Hutchins (1983) with the following exceptions: origin of the dorsal and anal fins are taken from where the fin fold concerned makes an obvious elevated rise away from the specimen's body; a low dorsal or ventral skin ridge may precede the fins and care should be taken not to include this feature in the measurement (generally the fin fold is more translucent than the skin ridge as there is less musculature associated with the former); all measurements pertaining to the eye are measured to the edge of the bony orbit; gill slit length is the maximum dimension of the opening, and is measured laterally between the two

Key to the species of *Alabes*

- 1 Pelvic-fin rudiment present, located on ventral surface just behind level of gill opening 2
 — Pelvic-fin rudiment absent 5
- 2 Pelvic-fin rudiment moderate in size, fin rays present; postocular pore 1 3
 — Pelvic-fin rudiment small, pelvic fin rays (if present) not visible; postocular pores 2, usually widely separated 4
- 3 Body relatively robust (depth 9.3–11.6 in SL); dorsal fin relatively high, continued anteriorly as a prominent fin fold to area above urogenital opening (snout to origin of dorsal fin 2.0–3.5 in SL); blackish circular blotches often present on middle of side of large adults (NSW, Vic, Tas, and SA) *A. dorsalis*
 — Body relatively slender (depth 12.5–14.9 in SL); dorsal fin relatively low, origin falling well short of point over urogenital opening (snout to origin of dorsal fin 1.5–2.4 in SL); no dark circular blotches on side of large adults (WA) *A. elongata* n.sp.
- 4 Head relatively large, length 6.7–8.4 in SL; posterior nasal pore absent; back not usually hunchbacklike, although ripe female may have this appearance; maximum SL 36 mm (WA) *A. brevis*
 — Head relatively small, length 9.8–11.4 in SL; posterior nasal pore present; back prominently hunchbacklike in all specimens; maximum SL 91 mm (WA) *A. gibbosa* n.sp.
- 5 Gill slit moderately large, length 3.1–4.3 in head length; no postocular pores or nasal pores (Tas and WA) *A. obtusirostris*
 — Gill slit small, length 5.4–22.9 in head length; postocular pores 1 or 2; nasal pores present or absent 6
- 6 Origin of dorsal fin just behind head; anal fin absent or restricted to region just anterior to caudal fin; interorbital very narrow, width 16.4–22.6 in head length; body orange in life (not translucent posteriorly), sides with alternating wide black and narrow white bars (NSW, Vic, and Tas) *A. scotti* n.sp.
 — Origin of dorsal fin over region of urogenital opening or behind; anal fin prominent, extending about half way from caudal fin to anus; interorbital relatively wide, width 5.4–10.8 in head length; body translucent posteriorly in life, sides without alternating black and white bars 7
- 7 Postocular pores 2; posterior nasal pore usually present; caudal-fin rays 7–8 (NSW, Vic, Tas, SA, WA) *A. hoesei*
 — Postocular pores 1; posterior nasal pore absent; caudal-fin rays fewer than 7 8
- 8 Origin of dorsal fin over region of urogenital opening; caudal-fin rays 4–6 9
 — Origin of dorsal fin well posterior to region of urogenital opening; caudal-fin rays absent (Norfolk Island) *Alabes* sp.
- 9 Male with pattern of tiger-like bars on upper side of body in life, not merging ventrally with longitudinal series of four blackish to dark blue blotches on side of abdomen, blotches extending about half way to urogenital opening; lacrymal pores usually present (Qld, NSW, Tas) *A. parvula*
 — Male with irregular arrangement of tiger-like stripes on head, merging ventrally with 2–3 blackish blotches that extend about one-third way to urogenital opening; lacrymal pores absent (WA) *A. occidentalis* n.sp.

extremities (the measurement was not taken if the opening was torn). All cephalic sensory pores are very small but the postocular pore is usually the easiest to detect (see Springer & Fraser [1976: fig. 10] for the location of pores). Cleared and stained material was examined for vertebral counts; although much of the non-cleared and stained material was x-rayed, this proved unsatisfactory for making accurate counts in many of the smaller specimens. Table 1 lists the diagnostic characters for all the known species of *Alabes* (the following abbreviations are used in this table: POP—postocular pore; ANP—anterior nasal pore; PNP—posterior nasal pore; LP—lacrymal pores). The tables of meristics presented in the descriptive sections sometimes report only a selection of the available paratypes. These were selected to provide examples across the whole size range of the material. The counts and proportions appearing in parentheses represent the ranges for the paratypes where different from those of the holotype. The gender of *Alabes* is now considered to be feminine following Eschmeyer (1990). Institutional codes follow Leviton *et al.* (1985). Standard length is abbreviated SL, and head length is abbreviated HL.

Alabes Cloquet, 1816

Diagnosis (these characters are not repeated in the following descriptions): body elongate, eel-like, tapering to a small caudal fin; caudal fin with 4–12 fin rays, joined to dorsal and anal fins (latter two without fin-rays, resembling low folds of skin); pectoral fin absent; pelvic fin either represented by a small rudiment just posterior to gill opening, or absent; skin smooth, scaleless, usually covered with a thick mucus layer; lateral-line sensory system usually consists of small open cephalic pores and minute papillae (cephalic pores absent in one species); head small, with a short snout (rounded to pointed in dorsal view); nostrils small but obvious, anterior one tubular, posterior one with low raised rim; eye moderate in size, with prominent, clear cornea; gill opening a small to moderate-sized transverse slit, located on ventral surface of head; gills 3; branchiostegals 3; palatine and vomerine teeth absent; urogenital opening with prominent papilla.

Alabes elongata n.sp.

Fig. 2; Tables 1–2

Alabes dorsalis (*non* Richardson). Hutchins, 1994: 313 (in part).

Type material. HOLOTYPE: WAM P.28296-003, 86 mm SL, male, Western Australia, Recherche Archipelago, Mondrain Island, eastern side of island (34°08'S 122°15'E), rock and weed, rotenone at 5–6 m, J.B. Hutchins *et al.*, 13 April 1984. PARATYPES (5 specimens, 42–92 mm SL, from Western Australia): AMS I.42136-001, 80 mm SL, male, collected with holotype; WAM P.26004-012, 56 mm SL, Recherche Archipelago, Lucky Bay, unnamed island on eastern side of bay (34°00'S 122°14'E), rock and weed, rotenone at 14 m, J.B. Hutchins, 17 March 1978; WAM P.28280-002, 58 mm SL (cleared and stained), female, Israelite Bay, Dempster Point (33°37'S 123°53'E), seagrass bed, box trawl at 0.5–2.0 m, J.B. Hutchins, 1 April 1984; WAM P.28296-050, 92 mm SL, male, collected with holotype; WAM P.32205-001, 42 mm SL, Cervantes, NW of Outer Rocks

(30°26'S 114°59'E), rocky reef, in sponge at 15 m, L.M. Marsh *et al.*, 4 May 1987.

Diagnosis. Diagnostic characters of *Alabes elongata* are listed in Table 1. It differs from all other species of *Alabes* by a combination of its elongate but robust body (depth 12.5–14.9 in SL), large gill slit (2.9–4.4 in HL), prominent rudimentary pelvic fin with obvious fin rays, single postocular pore on each side of head, and unique colour pattern. *Alabes elongata* is most similar to *A. dorsalis*, differing in its more elongate body (depth usually greater than 12 times in SL versus 11 or less) and different coloration (lacks the dark circular blotches on midside of body that characterize the adult male of *A. dorsalis*).

Description. Measurements of the holotype and paratypes are presented in Table 2. Maximum body depth 13.5 (12.5–14.9) and width at level of gill slit (= maximum body width) 13.9 (13.1–18.6), both in SL; head bluntly rounded anteriorly, somewhat compressed, slightly wider than body, head width 1.5 (1.4–1.8) in HL; HL 8.2 (7.9–9.1) in SL; snout short, rounded to truncate in dorsal view, length 4.4 (3.9–4.8) in HL; diameter of orbit 4.2 (4.3–5.6) in HL, slightly greater than bony interorbital width (5.1 [4.1–6.9] in HL); total of two lateral-line pores on each side of head, consisting of one postocular pore and one anterior nasal pore (indication of dorsal lacrymal pore visible in smallest paratype); gill opening a moderately wide slit, length 3.0 (2.9–4.4) in HL; mouth slightly inferior, upper lip projecting slightly forward of lower lip; rear corner of mouth below or slightly behind anterior margin of eye; teeth small, conical, caninelike, 1–2 rows in upper and lower jaws;

Table 2. Measurements (mm) and counts of the holotype and selected paratypes of *Alabes elongata n.sp.*

	holotype		paratypes		
	WAM P.28296-003	WAM P.28296-050	AMS I.42136-001	WAM P.26004-012	WAM P.32205-001
standard length	86	92	80	56	42
head length	11	12	9.7	6.2	5.0
snout length	2.4	2.6	2.2	1.3	1.3
eye diameter	2.5	2.2	1.8	1.5	0.9
interorbital width	2.0	2.8	2.0	1.0	0.7
gill-slit width	3.5	4.0	3.3	1.4	1.5
head width	7.2	8.2	6.7	3.5	3.1
body width at gill slit	6.2	7.0	6.0	3.0	2.7
body width (max.)	6.2	7.0	6.0	3.0	2.7
body depth (max.)	6.3	7.3	6.0	3.9	2.8
snout to dorsal fin	37	38	34	31	28
snout to anal fin	52	63	52	39	32
snout to anus	35	36	33	20	16
caudal-fin rays	7(8?)	9	8	8	6
postocular pores	1	1	1	1	1
post. nasal pores	0	0	0	0	0
ant. nasal pores	1	1	1	1?	1
dorsal lacrymal pores	0	0	0	0	1?
ventral lacrymal pores	0	0	0	0	0
sex	male	male	male	male?	female?

caudal fin with 7 (6–9) fin rays; bases of dorsal and anal fins long, insertion of dorsal fin slightly to well posterior to vertical through urogenital opening (snout to insertion 2.3 [1.5–2.4] in SL); insertion of anal fin about half way between urogenital opening and caudal fin (snout to insertion 1.7 [1.3–1.5] in SL); total vertebrae 75 (74–78), precaudal 22, last epineural on 28th vertebra.

Preserved coloration. Head and body overall pale creamy brown, fins more translucent.

Live coloration (based on colour transparencies of freshly collected holotype, see Fig. 2): ground colour pale creamy brown, with fine mottling of darker brown tending to form narrow, somewhat irregular cross bars on anterior portion of body, breaking up into a fine irregular reticulate pattern enclosing pale spots on posterior two-thirds (pattern extending onto fins); head with faint darker cross bars, red colour of gills visible through skin; paratypes range from similar to holotype to an overall pale brown or apple green without markings (smaller specimens).

Distribution. *Alabes elongata* is known only from southern Western Australia, from the Recherche Archipelago (including Israelite Bay) in the southeast to Cervantes on the mid-west coast.

Remarks. This species inhabits reef and weed areas from the intertidal to depths of 15 m. It has been found in both seagrass beds as well as on rocky reefs. It is apparently the sister species of *Alabes dorsalis* (both possess large gill openings and prominent pelvic-fin rudiments), the latter occurring in shallow intertidal areas of New South Wales, Victoria, Tasmania and South Australia. The two differ mainly in body depth and coloration of the adult male (see Diagnosis above). It is named *elongata* with reference to its elongate body.

Alabes gibbosa n.sp

Fig. 3; Tables 1, 3

Alabes brevis (non Springer & Fraser). Hutchins, 1991: 630, fig.

Type material. HOLOTYPE: WAM P.27985-001, 67 mm SL, male, Western Australia, Carnac Island, bay on eastern side (32°07'S 115°40'E), seagrass beds, box trawl at 3–4 m, J.B. Hutchins, 13 January 1982. PARATYPES (4 specimens, 71–91 mm SL, from Western Australia): WAM P.32206-001, 91 mm SL, female, Safety Bay, off yacht club towards Three Sisters (32°18.5'S 115°42.3'E), seagrass bed, beam trawl, P. Chalmer, 24 September 1981; WAM P.32207-001, 71 mm SL (cleared and stained), Carnac Island, bay on eastern side, seagrass, boxtrawl at 2 m, J.B. Hutchins and N.O. Sinclair, 10 February 1983; WAM P.32208-001, 87 mm SL, Rottneest Island, Porpoise Bay (32°01'S 115°32'E), seagrass, box trawl at 3–4 m, J.B. Hutchins and S. Morrison, 09 August 1996; WAM P.32209-001, 84 mm SL, Cockburn Sound, Success Bank (32°05'S 115°43'E), seagrass and sand, beam trawl, Murdoch University, 5 March 1997.

Diagnosis. The diagnostic characters of *Alabes gibbosa* are listed in Table 1. It differs from all other species of *Alabes* by a combination of its deep body (7.8–9.5 in SL), which usually exhibits a gibbous dorsal profile, relatively large gill slit (3.3–3.9 in HL), moderate-sized rudimentary pelvic

fin without obvious pelvic spines or fin rays, two postocular pores, one post nasal pore above eye on each side of head, and a unique colour pattern. *Alabes gibbosa* is most similar to its apparent sister species, *A. brevis*, differing in its deeper and larger body (maximum size 91 mm SL versus 36 respectively), presence of a post nasal pore (usually absent in the latter species), more vertebrae (68–69 versus 61–62), and different coloration (males of *A. gibbosa* never develop a tigerlike pattern of irregular dark bars on the side of the head as found in *A. brevis*).

Description. Measurements of the holotype and paratypes are presented in Table 3. Body elongate and very compressed, dorsal profile rising abruptly over level of gill opening, reaching a maximum depth about midway between snout tip and caudal fin base, maximum body depth 7.8 (7.9–9.5) in SL, maximum body width 14.8 (11.6–22.6) and width at level of gill slit 19.1 (16.7–27.3), all in SL; head slightly rounded to somewhat pointed anteriorly, a little wider than body (head width 1.6 [1.5–2.1] in HL), HL 9.8 (9.8–11.4) in SL; snout triangular in dorsal view with rounded extremity, length 5.5 (4.0–5.3) in HL; diameter of orbit 4.2 (4.2–4.9) in HL, somewhat greater than bony interorbital width (5.5 [5.2–8.9] in HL); total of six cephalic pores on each side of head, consisting of two postocular pores widely separated, one posterior nasal pore, one anterior nasal pore and two lacrymal pores; gill opening a moderately narrow slit, length 3.9 (3.3–3.9) in HL; mouth slightly inferior, upper lip projecting slightly forwards of lower lip; rear corner of mouth below anterior margin of eye or slightly behind; teeth small, conical, somewhat caninelike, 1–2 rows in upper and lower jaws; caudal fin

Table 3. Measurements (mm) and counts of the holotype and selected paratypes of *Alabes gibbosa* n.sp.

	holotype		paratypes		
	WAM P.27985-001	WAM P.32206-001	WAM P.32208-001	WAM P.32209-001	WAM P.32207-001
standard length	67	91	87	84	71
head length	6.8	8.0	8.2	7.5	7.3
snout length	1.2	1.6	1.6	1.9	1.4
eye diameter	1.6	1.7	1.7	1.6	1.7
interorbital width	1.2	1.5	0.9	1.1	1.4
gill-slit width	1.8	2.4	2.2	1.9	2.0
head width	4.2	5.1	5.2	3.5	4.8
body width at gill slit	3.5	4.6	3.8	3.1	4.3
body width (max.)	4.5	7.1	3.8	3.8	6.1
body depth (max.)	8.5	10	9.2	11	8.8
snout to dorsal fin	26	28	39	31	29
snout to anal fin	28	33	40	36	35
snout to anus	21	33	28	26	23
caudal-fin rays	9	9	10	11	10
postocular pores	2	2	2	2	2
post. nasal pores	1	1	1	1	1
ant. nasal pores	1	1	1	1	1
dorsal lacrymal pores	1	1	1	1	1
ventral lacrymal pores	1	1	1	1	1
sex	male	female	male	male?	?

with 9 (9–11) fin rays; bases of dorsal and anal fins long, insertion of dorsal fin usually well posterior to vertical through urogenital opening (snout to insertion 2.5 [2.2–2.7] in SL), but in one paratype, origin of fin difficult to detect and appears to be over region of urogenital opening (3.25 in SL); insertion of anal fin a short distance posterior to urogenital opening (snout to insertion 2.4 [2.0–2.8] in SL); total vertebrae could not be counted for holotype but cleared and stained paratype has a total of 68 vertebra (19 precaudal), with last epineural on 20th vertebra (radiographs of two additional paratypes indicate counts of about 19+49–50 = 68–69).

Preserved coloration. Head and body overall pale brown, fins slightly more translucent (paratypes are similar in colour to holotype, but usually are a paler creamy brown with more translucent fins).

Live coloration (based on colour transparencies of a freshly collected specimen from Carnac Island [see Fig. 3], and live aquarium-maintained individuals)—ground colour apple green, somewhat translucent (internal organs slightly visible), with a sprinkling of dusky and pale spots on body, largest on midside of body following course of lateral-line (each lateral line papilla enclosed in a minute white spot, surrounded by a larger dusky spot) (see also colour plate in Hutchins, 1991); thin dark brown stripe continues from snout, through eye, to preopercular margin; snout and upper lip mostly brownish, lower lip whitish; in life, dusky spots may be very faint and white spots—especially those on rear portion of body—may be more silvery and considerably larger in size; body colour continued on to fins, with indications of faintly darker cross bars.

Distribution. *Alabes gibbosa* is known only from the Perth region of Western Australia, from Safety Bay to Rottnest Island.

Remarks. This species has only been collected from shallow coastal waters at depths between 2 and 4 m. It is similar to *Alabes brevis* (also endemic to southwestern Australia), from which it differs as described in the diagnosis above. Both occur in seagrass but *A. brevis* is also found in vegetation growing on shallow coastal rocky reefs.

Alabes obtusirostris n.sp

Fig. 1; Tables 1, 4

Type material. HOLOTYPE: CSIRO H.4462-01, 46 mm SL, Victoria, east of Lakes Entrance (between 37°52.8'S 148°11.8'E and 37°51.7'S 148°13.8'E), benthic sled at 28 m, FRV *Southern Surveyor*, 24 November 1996. PARATYPE: AMS I.37755-001, 21 mm SL, Western Australia, east of Binningup (33°09'S 114°49'E), depth 65 m, CSIRO, 10 August 1962 (field number G3/176/62).

Diagnosis. The diagnostic characters of *Alabes obtusirostris* are listed in Table 1. It differs from all other species of *Alabes* by a combination of its moderately large gill opening (3.1–4.3 in HL), lack of a pelvic-fin rudiment, absence of all cephalic pores in the lateral-line system, and its large number (40) of epineural ribs. It possesses a short, blunt head with wide lips (giving it a rather pugnacious appearance), and short dorsal and anal fins.

Description. Measurements of the holotype and paratypes are presented in Table 4. Body almost cylindrical, reaching a maximum depth about middle of body, then tapering posteriorly, body depth 13.6 (17.6) in SL, maximum body width (= width at level of gill slit) 14.3 (19.2) in SL; head rounded to somewhat blunt anteriorly, a little wider than body (head width 1.6 [1.9] in HL), HL 8.4(8.5) in SL; snout rather truncate in dorsal view, length 4.6 (4.1) in HL; diameter of orbit 4.8 (3.8) in HL, noticeably greater than bony interorbital width (6.9 [10.3] in HL); lateral-line sensory system lacking cephalic pores; gill opening a moderately narrow slit, length 3.1 (4.3) in HL; mouth terminal or lower jaw slightly projecting over upper jaw, upper and lower lips both fleshy and wide, producing a somewhat pugnacious appearance, rear corner of mouth reaching almost to below anterior margin of eye (pigmented area); teeth in holotype worn and more incisorform, those of paratype smaller, conical, caninelike, 1 row in upper and lower jaws; caudal fin with 8 fin rays; bases of dorsal and anal fins relatively short, insertion of dorsal fin well posterior to vertical through urogenital opening (snout to insertion 1.7 [2.0], snout to urogenital opening 2.5, both in SL); anal fin very short, insertion almost at caudal fin (snout to insertion 1.2 [1.1] in SL); total vertebrae could not be counted for holotype but cleared and stained paratype has a total of 70 vertebra (23 precaudal), with last epineural on 40th vertebra.

Preserved coloration (in alcohol). Head and body overall pale brown, fins more translucent; very faint indication of 3–5 reddish crossbands or blotches on body, more obvious on lower half of body.

Live coloration. Unknown but bands described above could have been blackish (see colour description of *A. scotti* n.sp. below).

Distribution. *Alabes obtusirostris* is known from only two locations: off Lakes Entrance in Victoria and off Binningup in southwestern Western Australia.

Remarks. This species has only been collected from coastal waters at depths between 28 and 65 m. Like *Alabes scotti* (described below), it appears to inhabit sandy bottoms. However, morphologically, it has more in common with *A. dorsalis* and *A. elongata* (described above); its body anteriorly is rather cylindrical in cross-section and it

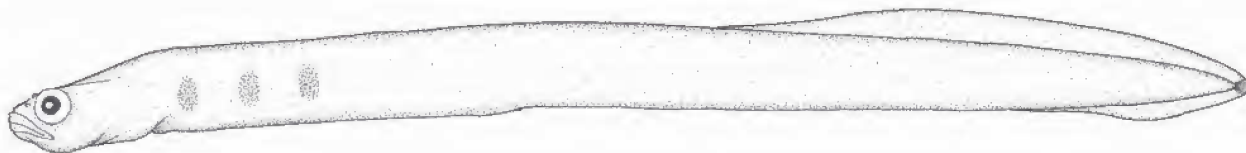


Fig. 1. *Alabes obtusirostris*. Holotype, CSIRO H.4462-01, 46 mm SL, Lakes Entrance, Victoria (drawn by S. Morrison).

possesses a large gill opening, but it lacks the prominent rudimentary pelvic fin that characterizes the latter two species. This species is named *obtusirostris* with reference to its blunt snout.

Table 4. Measurements (mm) and counts of the holotype and paratype of *Alabes obtusirostris* n.sp.

	holotype	paratype
	CSIRO H.4462-01	AMS I.37755-001
Standard length	46	21
Head length	5.5	2.5
Snout length	1.2	0.6
Eye diameter	1.1	0.6
Interorbital width	0.8	0.2
Gill-slit width	1.8	0.6
Head width	3.4	1.3
Body width at gill slit	3.2	1.1
Body width (max.)	3.2	1.1
Body depth (max.)	3.4	1.2
Snout to dorsal fin	27	11
Snout to anal fin	38	20
Snout to anus	19	8.8
Caudal-fin rays	8	8
Postocular pores	0	0
Post. nasal pores	0	0
Ant. nasal pores	0	0
Dorsal lacrymal pores	0	0
Ventral lacrymal pores	0	0

***Alabes occidentalis* n.sp.**

Fig. 4; Tables 1, 5

Alabes parvulus (non McCulloch). Springer & Fraser, 1976: 19, fig. 12 (in part); Hutchins, 1991: 630, fig.; Hutchins, 1994: 314 (in part).

Type material. HOLOTYPE: WAM P.25465-001, 36 mm SL, male, Western Australia, Safety Bay, Seal Island (32°17.4'S 115°41.1'E), beam trawl in seagrass, J. Scott, 3 October 1975. PARATYPES (28 specimens, 17–40 mm SL, from Western Australia): AMS I.42137-001, 37 mm SL, male, collected with WAM P.28267-001 (see below); WAM P.25465-004, 3 specimens, 22–40 mm SL, collected with holotype; WAM P.25805-002, 26 mm SL, near Garden Island, just west of Five Fathom Bank (32°17'S 115°31'E), trawled at 37 m, N. Sarti and R. George, 29 June 1977; WAM P.27952-012, 5 specimens, 17–31 mm SL, Jurien Bay, south side of Boullanger Island (30°18'S 115°00'E), seagrass bed, box trawl at 1 m, J.B. Hutchins *et al.*, 11 April 1983; WAM P.28267-001, 5 specimens, 34–38 mm SL, Carnac Island, east of island (32°07'S 115°40'E), seagrass, box trawl at 3–4 m, J.B. Hutchins *et al.*, 10 February 1984; WAM P.28280-001, 6 specimens, 27–35 mm SL (2 cleared and stained), Israelite Bay, near Point Dempster (33°37'S

123°53'E), seagrass, box trawl at 0.5–2.0 m, J.B. Hutchins, 1 April 1984; WAM P.28291-001, 3 specimens, 27–30 mm SL, Great Australian Bight, Twilight Cove, just off beach (32°16'S 126°02'E), seagrass, box trawl at 0.2–1 m, J.B. Hutchins, 10 April 1984; WAM P.30384-002, 4 specimens, 29–39 mm SL, Rottneest Island, Porpoise Bay (32°01'S 115°32'E), seagrass, box trawl at 2–4 m, J.B. Hutchins, 21 November 1991.

Diagnosis. The diagnostic characters of *Alabes occidentalis* are listed in Table 1. It differs from all other species of *Alabes* by a combination of its elongate transparent body (depth 9.1–15.9 in SL), very small gill slit (5.4–17.5 in HL), no rudimentary pelvic fin, single postocular pore, anterior nasal pore present but posterior nasal pore absent, no lacrymal pores and unique colour pattern in adult male (tiger-like brownish orange bars anteriorly on side of body, darker ventrally). *Alabes occidentalis* is very similar to *A. parvula*, differing in the shape of the posterior portion of the gut (shorter and more rounded in *A. parvula* when viewed laterally in freshly caught material), lack of lacrymal pores (usually present in *A. parvula*) and in coloration of the adult male (see Remarks below).

Description. Measurements of the holotype and paratypes are presented in Table 5. Body elongate, more subcylindrical in adult male, maximum body depth 9.1 (9.9–15.9), maximum body width 16.7 (15.5–22.4) and body width at level of gill slit 16.7 (15.5–20.5), all in SL; head pointed, compressed, length 8.3 (7.8–10.0) in SL; snout rounded to slightly truncate in dorsal view, length 3.6 (3.1–4.0) in HL; diameter of orbit 3.5 (3.0–4.1) in HL, prominently larger than bony interorbital width (5.6 [6.5–10.4] in HL); total of two cephalic pores on each side of head, consisting of one postocular pore, one anterior nasal pore (no clearly defined lacrymal pores could be found); gill opening a short, narrow slit, width 8.2 (5.4–17.5) in HL; mouth inferior, upper lip projecting slightly forward of lower lip; rear corner of mouth below anterior margin of eye or slightly behind; teeth small but caninellike, 1–2 rows in upper and lower jaws; caudal fin apparently deformed in holotype, with only 1 or 2 rays (paratypes with 4–6 fin rays), continuous with dorsal and anal fins; bases of dorsal and anal fins long, insertion of dorsal fin over or slightly behind vertical through urogenital opening, snout to insertion 2.6 [2.7–3.1] in SL; insertion of anal fin about half way between urogenital opening and caudal fin (snout to insertion 1.7 [1.6–1.8] in SL); total vertebrae 63–69, precaudal 15–17, last epineural on 16–17th vertebra.

Preserved coloration (in alcohol). Head and body pale brown overall, fins more translucent (see also Remarks below).

Live coloration (based on colour transparencies of freshly collected material, Fig. 4): male—body mostly translucent to transparent, with organs visible through skin, although abdominal portion becoming more milky coloured anteriorly with a tiger-like pattern of brownish orange bars, distinctly darker ventrally, bars extending less than half distance to urogenital opening (see Springer & Fraser, 1976: fig. 12d,e [as *Alabes parvulus*]); head brown, consisting of dark brown blotches below and behind eye; silvery white spot at rear of body (not always visible); dorsal fin with dusky blotches along length, fading posteriorly (usually no

Table 5. Measurements (mm) and counts of the holotype and selected paratypes of *Alabes occidentalis* n.sp.

	holotype				paratypes				
	WAM P.25465-001	WAM P.25465-004	WAM P.28267-001	WAM P.28280-001	WAM P.28267-001	WAM P.27952-012	WAM P.28280-001	WAM P.28291-001	WAM P.25805-002
standard length (SL)	36	40	38	35	34	31	27	27	26
head length	4.3	4.2	4.0	3.6	3.9	3.9	3.2	3.4	3.1
snout length	1.2	1.2	1.2	1.0	1.1	1.1	0.9	0.8	1.1
eye diameter	1.2	1.2	1.2	1.2	1.2	1.2	1.0	1.1	0.8
interorbital width	0.8	0.6	0.4	0.5	0.4	0.4	0.4	0.4	0.3
gill slit width	0.5	0.4	0.5	0.7	0.4	0.4	0.4	0.2	0.3
head width	2.6	2.3	2.2	1.9	2.1	1.9	1.6	1.7	1.5
body width at gill slit	2.1	2.0	2.0	1.7	2.0	1.7	1.3	1.4	1.3
body width (max.)	2.1	2.2	2.2	1.7	2.0	1.7	1.3	1.4	1.3
body depth (max.)	3.9	4.1	3.2	3.2	3.0	3.0	2.2	2.4	1.6
snout to dorsal fin	14	14	14	11	12	11	10	10	9
snout to anal fin	21	24	22	22	20	19	16	17	14
snout to anus	11	13	12	11	10	10	8.8	8.8	8.5
caudal fin rays	1(2?)*	6	6	6	6	5	5	5	6
postocular pores	1	1	1	1	1	1	1	1	1
post. nasal pores	0	0	0	0	0	0	0	0	0
ant. nasal pores	1	1	1	1	1	?	1	1	1
dorsal lacrymal pores	0	0	0	0	0	0	0	0	0
ventral lacrymal pores	0	0	0	0	0	0	0	0	0
sex	male	female	male	female	female	male	female	female	female

* Count affected by deformity

dusky bars on dorsal surface of back); female—body transparent, with all organs visible through skin (see Hutchins, 1991: 631 [as *Alabes parvulus*]); no tiger-like pattern of bars anteriorly although numerous short, dark-brown bars present across ventral and dorsal surfaces of abdomen (see Springer & Fraser, 1976: fig. 12a–c); head mostly transparent with several short, dark bars and spots below eye; dusky blotches on dorsal fin and silvery white spot on rear of body as in male.

Distribution. *Alabes occidentalis* ranges from the Houtman Abrolhos in Western Australia to Twilight Cove in the Great Australian Bight. Specimens from South Australia and Tasmania identified as *Alabes parvula* may also prove to be this species, but freshly caught material has not yet been examined.

Remarks. *Alabes occidentalis*, unlike its apparent close relative, *A. parvula*, has only been taken from seagrass beds (the latter has also been found in reef and algal areas, particularly intertidal rock pools). The two species are so

similar that they were initially treated by Springer & Fraser (1976) as belonging to one species, *A. parvula*. The figures of that species (Springer & Fraser, 1976: fig. 12) were based wholly on Western Australian material, and are thus illustrative of *A. occidentalis* and not *A. parvula*. Although the female colour pattern of both species is similar, that of the male differs considerably between species. The male of *A. parvula*, in comparison to the colour description of *A. occidentalis* provided above, is distinguished by the following: anterior portion of body with a tiger-like pattern of irregular reddish-brown bars, bars continued onto head and break into spots, and also continue posteriorly, and break into spots; abdominal area bright orange to yellow with four large bluish black circular to rectangular blotches, arranged in a horizontal line along lower side, extending over half distance to urogenital opening. Other differences are described in the Diagnosis above. *Alabes hoesei* is also very similar to *A. occidentalis* but is easily distinguished by the higher number of cephalic sensory pores (Table 1). This species is named *occidentalis* because of its western distribution.

Alabes scotti n.sp.

Fig. 5; Tables 1, 6

Type material. HOLOTYPE: CSIRO H.3776-01, 48 mm SL, New South Wales, Disaster Bay (from 37°18.9'S 149°59.6'E to 37°16.5'S 149°59.3'E), benthic sled at 24–30 m, G. Yearsley on FRV *Southern Surveyor*, 2 September 1994. PARATYPES (7 specimens, 28–48 mm SL, from southeastern Australia): AMS I.23428-001, 3 specimens: 40–45 mm SL (smallest cleared and stained), Tasmania, off Wardley's Point (41°40'S 148°18'E), depth 27 m, P. Colman on RV *Sprightly*, 24 May 1973 (BMR station 573–2032); AMS I.36095-001, 28 mm SL, Tasmania, south of St Helens Point (41°30'S 148°17.5'E), benthic grab at 31 m (over very coarse yellowish sand), P. Colman on RV *Sprightly*, 24 March 1973 (BMR station S73–2033); AMS I.37680-001, 2 specimens, 39–41 mm SL, New South Wales, off Tathra (from 36°37'S 150°02'E to 36°40'S 150°04'E), bottom trawl at 38–46 m, FRV *Kapala*, 13 December 1994 (field number 94-33-04); WAM P.32222-001, 43 mm SL (cleared and stained), collected with AMS I.37680-001.

Diagnosis. The diagnostic characters of *Alabes scotti* are listed in Table 1. It differs from all other species of *Alabes* by a combination of its thin, elongate body, slender, acute head with relatively long, projecting upper lip, very small gill opening, 4–5 caudal-fin rays, long but very low dorsal fin, almost non-existent anal fin, and unique black and white barred coloration. *Alabes scotti* is similar to both *A. parvula* and *A. occidentalis* (described above), differing in coloration, its apparent lack of transparency of the body, and different vertebral features (see Table 1).

Description. Measurements of the holotype and paratypes are presented in Table 6. Body very elongate and sub-cylindrical, reaching a maximum depth about middle of body, then tapering to a very small caudal fin, body depth 15.8 (16.1–18.7) in SL, width at level of gill slit (= maximum body width) 23.3 (20.7–28.2) in SL; head acute, a little wider than body (head width 2.9 [2.6–3.0] in HL), HL 6.6 (6.2–7.2) in SL; snout triangular in dorsal view, with a pointed fleshy upper lip, length 5.4 (4.8–6.3) in HL; diameter of orbit 5.6 (5.3–5.9) in HL; bony interorbital very narrow, width (17.9 [16.4–22.6] in HL); total of two cephalic pores on each side of head, consisting of one postocular pore and one anterior nasal pore (latter very small and in some paratypes, difficult to detect). Gill opening very small, length 16.3 (13.6–23.0) in HL; mouth inferior, upper lip projecting well forward of lower lip (both lips fleshy), rear corner of mouth reaching almost to below anterior margin of eye (pigmented area); teeth conical, caninelike, 1 row in upper and lower jaws; margin of dorsal fin in holotype rather irregular in outline; caudal fin with 4 (4–5) fin rays; base of dorsal fin long, insertion just behind rear border of head (snout to insertion 5.2 [4.2–5.5] in SL); anal fin very short, lower than dorsal fin in height, insertion just anterior to caudal fin (snout to insertion 1.1 [1.0–1.3] in SL), continuing anteriorly as a low skin ridge; snout to urogenital opening 2.6 (2.5–2.7) in SL; urogenital papilla considerably enlarged in holotype; total vertebrae could not be counted for holotype but cleared and stained paratype has a total of 68 vertebra (22 precaudal), with last epineural on 26th vertebra.

Preserved coloration (in alcohol). Head and body overall pale brown, fins more translucent; 5 faint reddish crossbands on body, anteriormost at level of gill opening, posterior 4 continuing onto dorsal fin (urogenital opening located midway between bars 3 and 4).

Live coloration (based on a colour transparency of the holotype taken just after capture, Fig. 5): ground colour brownish orange, tail a little paler posteriorly; 5 blackish cross bars outlined with white on anterior portion of body, posterior two more brownish, although dorsal edge blackish; five white transverse lines interspersed between black bars, one between each pair of black bars and one anterior to first bar.

Distribution. *Alabes scotti* is known only from a few scattered coastal localities off southeastern Australia, from Tathra in southern New South Wales, west to Cape Everard in eastern Victoria, and south to the region of St Helens Point in northeastern Tasmania.

Remarks. *Alabes scotti* apparently lives on sandy bottoms at depths between 24 and 46 m from which it has been collected using benthic sleds and grabs. It occupies a similar habitat to that of *Alabes obtusirostris* (described above), and may be easily separated from the latter by its more acute head (latter has a blunt head). The late E.O.G Scott of Launceston, Tasmania, first brought this species to the senior author's attention in 1982 when he provided a rough illustration of a clingfish he believed was undescribed. Unfortunately he never pursued his plan to describe it and his specimens have not been located (R. Green, pers. comm.) This species, therefore, is named *scotti* in his honour.

Table 6. Measurements (mm) and counts of the holotype and selected paratypes of *Alabes scotti* n.sp.

	holotype		paratypes				
	CSIRO H.3776-01	AMS I.23428-001	AMS I.23428-001	WAM P.32222-001	AMS I.37680-001	AMS I.37680-001	AMS I.36095-001
standard length (SL)	48	45	43	43	41	39	28
head length	7.2	6.3	6.3	6.3	5.9	6.0	4.6
snout length	1.3	1.1	1.2	1.3	1.2	1.2	0.8
eye diameter	1.3	1.1	1.1	1.2	1.0	1.1	0.8
interorbital width	0.4	0.3	0.3	0.3	0.3	0.3	0.3
gill slit width	0.4	0.4	0.5	0.3	0.3	0.3	0.2
head width	2.5	2.3	2.4	2.2	2.0	2.1	1.6
body width at gill slit	2.0	1.8	1.8	1.7	1.6	1.7	1.0
body width (max.)	2.0	1.8	1.8	1.7	1.6	1.7	1.0
body depth (max.)	3.0	2.6	2.3	2.6	2.3	2.4	1.7
snout to dorsal fin	9.0	8.3	8.0	9.8	7.7	7.2	6.3
snout to anal fin	43	40	39	41	39	36	26
snout to anus	18	17	16	16	15	15	11
caudal fin rays	4	4	5	4	5	4	5
postocular pores	1	1	1	1	1	1	1
post. nasal pores	0	0	0	0	0	0	0
ant. nasal pores	1	1	1	1	?	?	1
dorsal lacrymal pores	0	0	0	0	0	0	0
ventral lacrymal pores	0	0	0	0	0	0	0
sex	?	?	?	?	?	?	?



Fig. 2. *Alabes elongata*. Holotype, male, WAM P.28296-003, 86 mm SL, Recherche Archipelago, Western Australia.



Fig. 3. *Alabes gibbosa*, paratype, WAM P.32202-001, 71 mm SL, Carnac Island, Western Australia; (a) whole specimen, (b) anterior half of specimen.

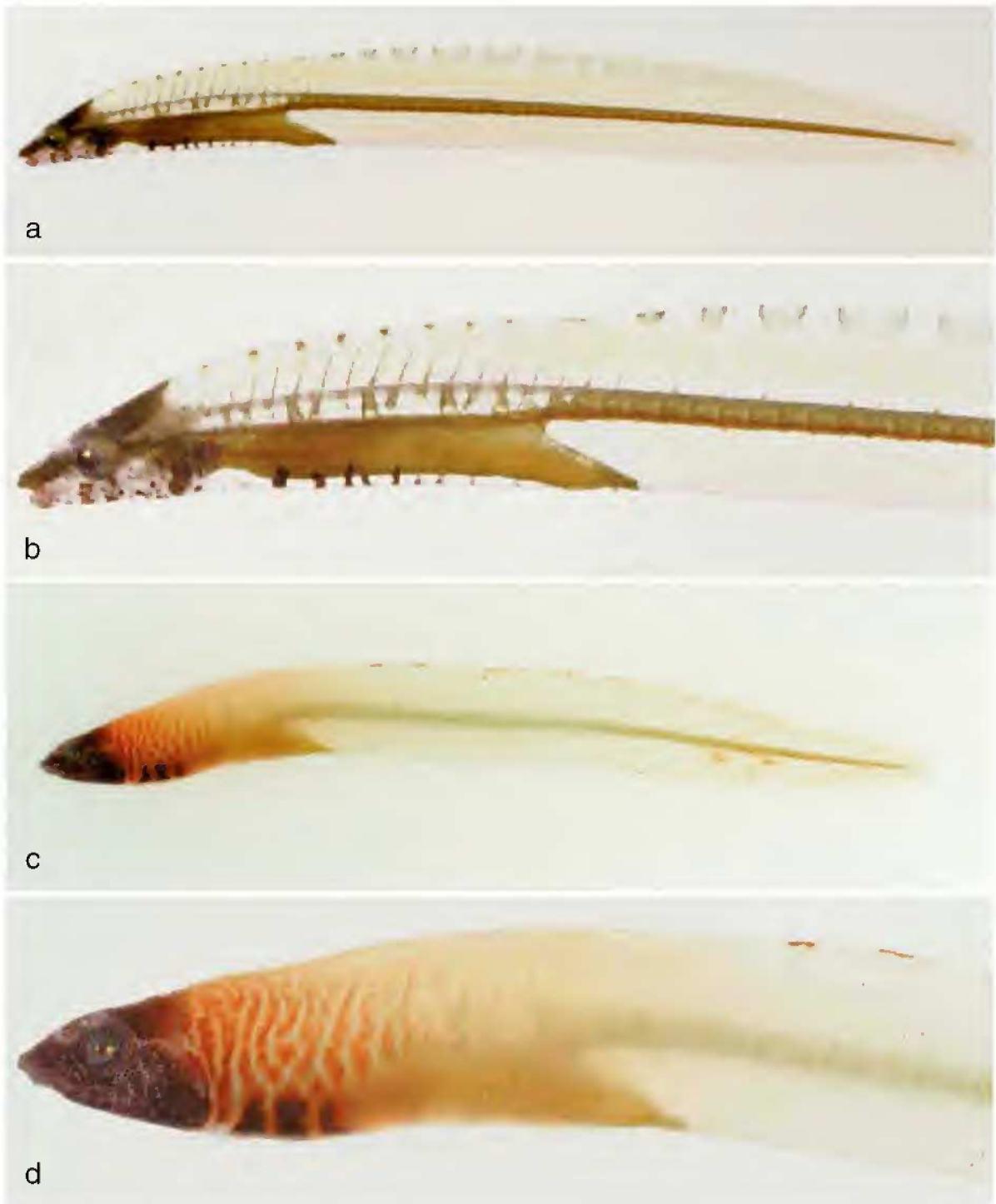


Fig. 4. *Alabes occidentalis* paratype, female, WAM P.28280-001, 35 mm SL, Israelite Bay, Western Australia: (a) whole specimen; (b) anterior half of specimen. Paratype, male, WAM P.30384-002, 38 mm SL, Rottnest Island, Western Australia: (c) whole specimen; (d) anterior half of specimen.



Fig. 5. *Alabes scotti*. Holotype, CSIRO H.3776-01, 48 mm SL, Disaster Bay, New South Wales (CSIRO photograph).

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